



The logo features the word "EMERGENCY" in large, bold, black capital letters at the top. Below it is a red asterisk-shaped graphic containing the number "9-1-1". To the right of the asterisk is a red antenna tower icon with three curved lines above it representing signal transmission. The text "Communications System" and "Bond Measure" is centered below the graphic in large, bold, black capital letters.

EMERGENCY

9-1-1

Communications System

Bond Measure

Proposal

May 17, 2016 Primary Election

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Executive Summary

The emergency communication system for Washington County was built in the early 1990s as a result of multi-agency cooperation supporting the mission of the Washington County Consolidated Communications Agency (WCCA), our 911 dispatch center. The purpose of the center is to assist the public in quickly receiving aid from law enforcement, fire or emergency medical agencies serving the community. The communications system is used by every city police department, the County Sheriff's Office, all fire and rescue responders and all emergency medical and ambulance responders operating countywide. When a call is made to 911, the system allows dispatchers to get all necessary responders to the caller's location as quickly as possible. The system also provides a vital link among these first responders as they coordinate, request backup or get aid to victims. Funding for installing the existing system was provided by a voter-approved levy in 1990.

Changes in technology, growth in demand for services and a better understanding of earthquake and other disaster risks in the Pacific Northwest are all prompting the need for system replacement and facilities upgrades.

- **Changes in Technology** – Equipment composing the current emergency communication system is aging and eventually at risk of failure. Replacement of the current system would enable first responders to engage in simultaneous conversations on the same digital platform with reliable countywide signal coverage. The improved technology would allow for better-managed use of congested radio airways, maximizing the use of spectrum bandwidth designated by the federal government to local emergency responders and giving multiple agencies the ability to communicate regardless of local, state or federal jurisdiction. Transitioning to improved technology would also be adaptable for data transmissions, encryption and use of text messages among first responders.
- **Changes in Service Demand** – When voters approved the 1990 levy providing funding for the current system, Washington County's population was 311,500 and most households used landline phones. Since that time, Washington County's population has almost doubled and most 911 calls are generated using a cell phone or smart phone. Population growth and associated emergency call volume are anticipated to continue increasing over the coming decades. Modernized equipment and room for expanded facilities would enable the 911 dispatch center to remain effective as population grows. In addition, by using bond funding to locate 911 emergency communications dispatchers with other emergency facilities, the County could more efficiently address overall space requirements.
- **Earthquakes and Risk from Other Disasters** – A consensus has emerged among geologists in recent years that the Pacific Northwest is overdue for a major earthquake similar in magnitude to that experienced in Japan in 2011. The frequency of wind, rain and snow storms has also increased in recent years. In the face of these and other natural hazards, our community relies on the emergency communications system to perform at a much higher standard than commercial telecommunications systems. Upgrading equipment and strengthening key facilities would improve the reliability of the emergency communications system even when a major emergency causes landline or cell phone networks to overload or fail.

To address these challenges, Washington County has worked with WCCCA and its member agencies to propose a bond measure for voter consideration at the Primary Election on May 17, 2016. The proposal would raise \$77 million for the capital improvements and equipment upgrades identified in this report. As shown in the table below, these funds would be generated through the County's issuance of general obligation bonded debt beginning in fiscal year 2016-17 and ending no later than fiscal year 2032-33. Revenue supporting these payments would be derived from an annual property tax levy over less than 21 years. Although the rate of this levy may vary depending on actual bond interest rates incurred and changes in assessed values over time, it is not expected to exceed 8 cents per \$1,000 of assessed value. For the average-valued Washington County home, the tax impact in the levy's first year would be approximately \$20 or \$1.70 per month.

Total estimated capital expenditures	\$77 million
Estimated first-year levy amount	\$4.6 million
Estimated cost per \$1,000 assessed value	Variable, but not expected to exceed 8 cents
Estimated first-year cost for average home	\$20
Estimated monthly cost in 1 st yr for average home	\$1.70

The tax rate and revenue for the bond period shown here reflects annual fluctuations based on assumed changes in assessed property values.

In short, we believe bond funding for this amount of facilities and other capital costs should accommodate:

- converting the existing system to more current technology;
- improving countywide radio coverage by installing additional towers where needed;
- strengthening facilities for earthquakes, storms and other major emergencies;
- providing for efficient expansion of the 911 center and emergency response facilities; and
- replacing approximately 3,000 analog radios currently used by responders throughout the county.

As a vital part of our community's public safety, the emergency communications system was built nearly 25 years ago to enable our police officers, firefighters and emergency medical personnel to arrive quickly and safely whenever and wherever a 911 call is made in Washington County. Through partnerships and careful planning, we are confident that reliable and effective response to emergencies in our community will continue as a result of implementing this proposal.

Background

The Washington County Consolidated Communications Agency (WCCA) was formed in 1985, under the authority of Oregon Revised Statutes (ORS) 190 by the execution of an intergovernmental agreement originally between Washington County and the cities of Beaverton, Cornelius, Hillsboro, North Plains and Washington County Rural Fire Protection Districts. 1 (now Tualatin Valley Fire and Rescue) and 2. WCCA subsequently entered into intergovernmental agreements with the cities of Banks, Durham, Forest Grove, King City, Sherwood, Tigard, Gaston and Tualatin. Subsequent fire districts joining the agency include Banks, Cornelius, Forest Grove and Gaston.

WCCA was established to provide 911 service and public safety communications for police, fire and emergency medical personnel from the participating jurisdictions and for other governments under contract. WCCA dispatches all calls for police, fire or medical assistance to the citizens of these cities and the unincorporated areas in Washington County.

WCCA History

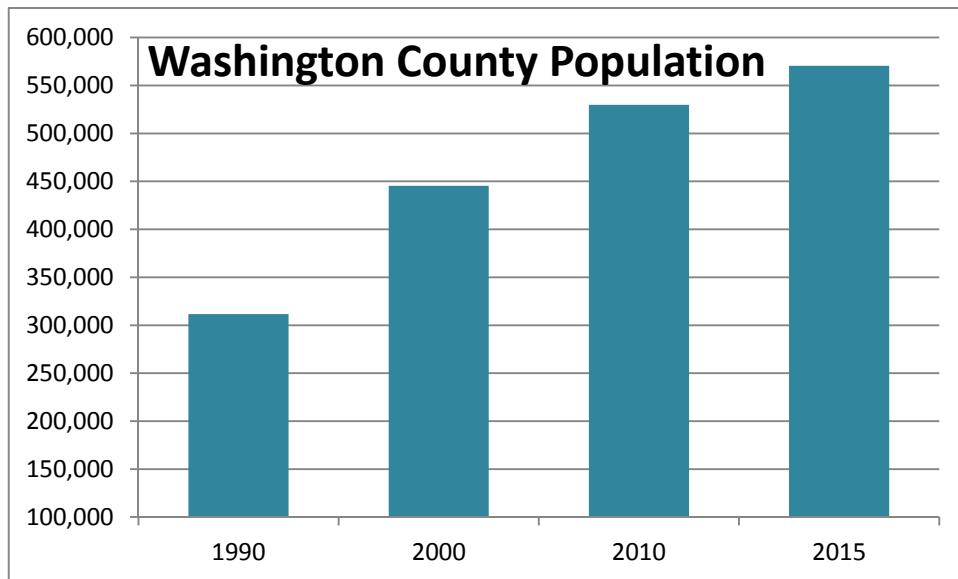
Prior to WCCA, Washington County public safety dispatching had existed since October of 1973 when the first civilian dispatchers were hired. Having civilian dispatchers freed police officers and firefighters to respond to calls rather than stay behind to answer phones and monitor radios. From 1973 to 1985, the dispatch center served as the communications hub for the Washington County Sheriff's Office and the cities of Cornelius, Banks, Hillsboro and Gaston as well as Washington County Fire District 2, the City of Hillsboro Fire Department, Cornelius Rural Fire Department and Banks Fire Department.

In the years following the switch to civilian dispatchers, a demand started to grow for all Oregon residents to have access to 911 service. In order to better facilitate this trend, a move toward the establishment of central emergency answering points began. As this was occurring, more and more police and fire departments did away with their individual dispatch facilities and merged with centralized dispatch. Thus in 1985, WCCA was "born" and became a consolidated dispatch center.

1990 Bond Measure

In 1990 the citizens of Washington County passed a serial levy which allowed a major upgrade to the county's emergency communications system. Due to the support of the levy, Washington County was able to purchase a building large enough to house WCCA's current operations, install a computer aided dispatch (CAD) system, upgrade the countywide analog communications system and become an enhanced 911 center where a caller's phone number and location is automatically displayed to dispatchers.

Population Growth and the Changing Demand for Service

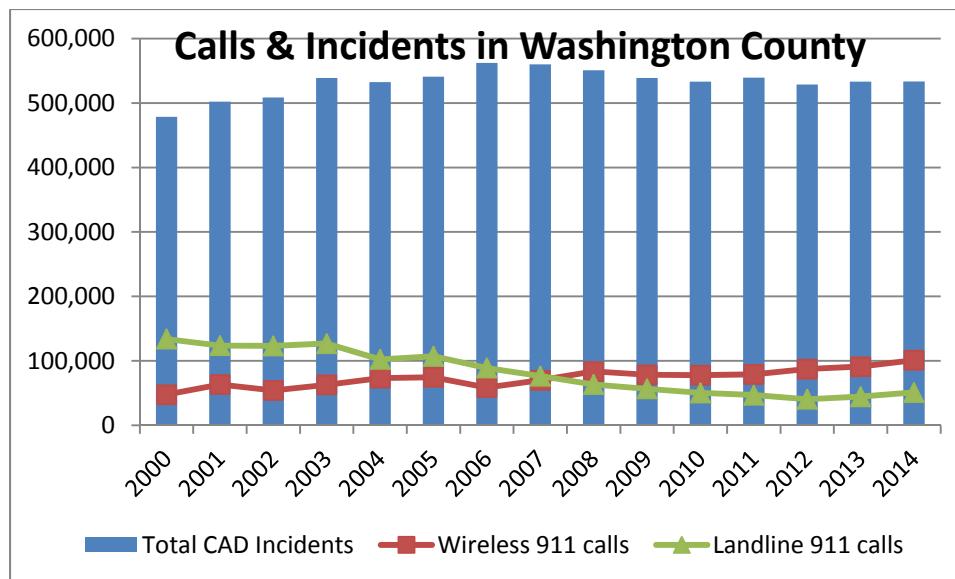


Sources: PSU Population Research Center, U.S. Census Bureau

With the expansion of high-technology manufacturing and other businesses in Washington County over the last 25 years, the population has grown substantially since the 1990 bond measure was passed.

According to the Population Research Center at Portland State University, the population has nearly doubled during that time, from 311,500 in 1990 to 570,510 as of 2015.¹ In addition, cell phone or smart phone use has emerged as the primary means the public chooses when making contact with 911 dispatch. The result of these trends has meant increasing and changing demand for emergency services prompted through calls to 911 dispatch.

¹ <http://www.pdx.edu/prc/population-reports-estimates>



Source: Washington County Consolidated Communications Agency Activity Study 2000 to 2014

Technology Changes and Federal Regulatory Trends

After the terrorist attack on September 11, 2001, the federal government highlighted the lack of interoperability as a weakness in the nationwide emergency communications system.² The inability to communicate among first-responder agencies during the 9/11 attack, and during other large-scale emergencies (such as hurricanes Katrina and Sandy), has highlighted the problem. Different agencies in different jurisdictions are not consistently able to engage in radio communication with analog technology. To address these issues, the Federal Communications Commission (FCC) is strongly encouraging a move to nationwide interoperability and digital technology.³

Within the past decade, the Association of Public-Safety Communications Officials (APCO) has developed "Project 25" (P25)⁴ as a widely accepted technical standard for emergency communications on a digital platform. This new standard includes capabilities for digital voice, encryption and more efficient groupings of simultaneous two-way conversations (called "trunking"). The P25 standard provides priority for emergency service calls, can survive severe storms, has built-in redundancies, can be adapted for data transmission and provides for wide interoperability across multiple agencies and jurisdictions.

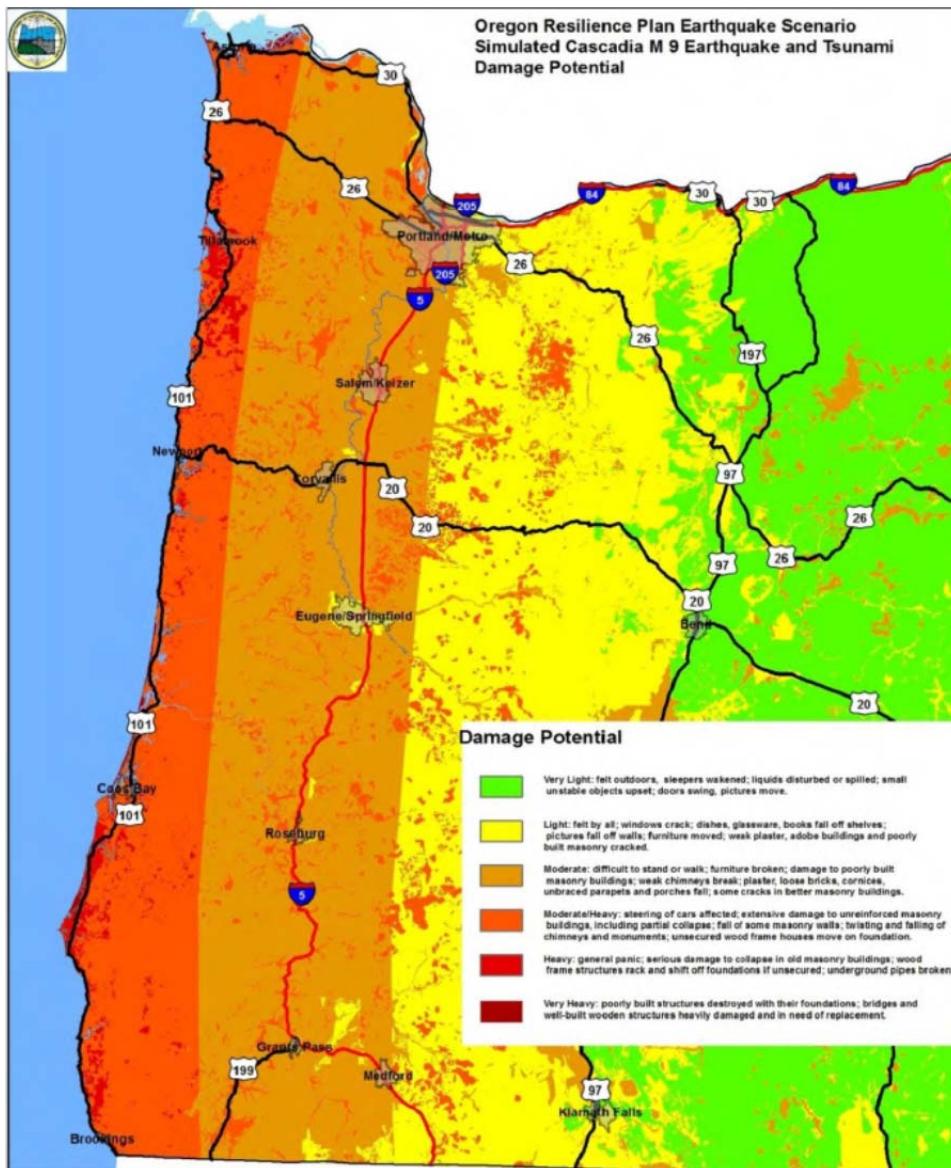
Driven in part by FCC regulations meant to make more efficient use of radio frequency bandwidth, national adoption of the P25 radio standard and equipment is intended to allow emergency responders to achieve mandated "narrowbanding" within the radio spectrum while emphasizing interoperability. The standardization also clarifies the specifications for future equipment and part purchases.

² <http://www.9-11commission.gov/report/911Report.pdf>

³ <http://transition.fcc.gov/pshs/public-safety-spectrum/narrowbanding.html>

⁴ <https://www.apcointl.org/spectrum-management/resources/interoperability/p25.html>

Risk of Earthquakes and Other Natural Disasters



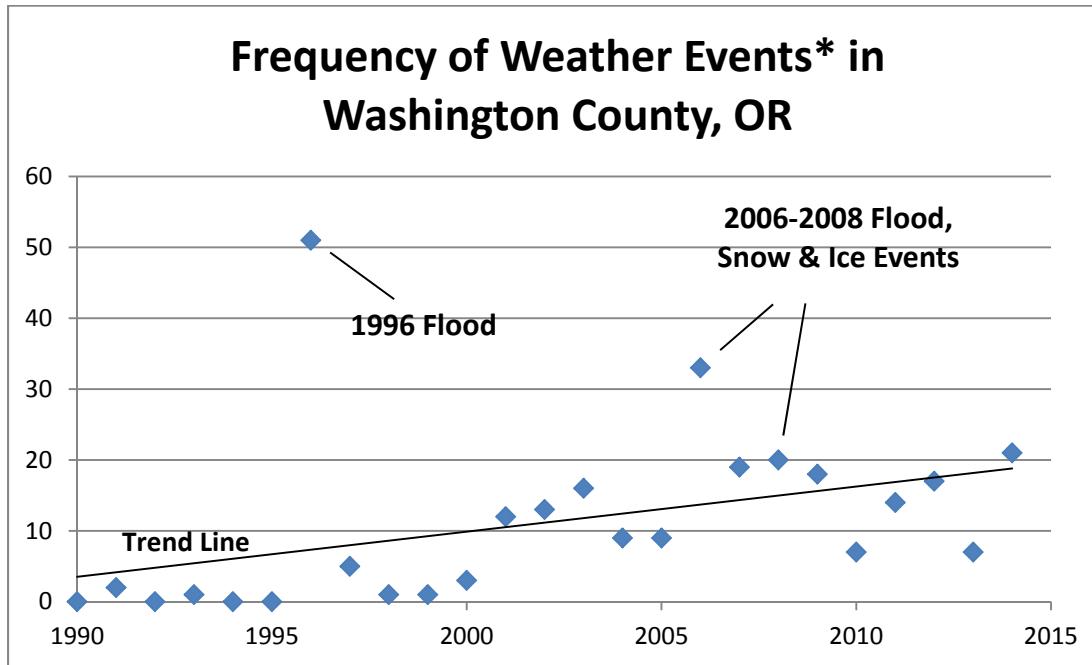
Source: Oregon Resilience Plan, Oregon Seismic Policy Advisory Commission, February 2013

A devastating earthquake along the Cascadia Subduction Zone just off the Pacific Northwest coastline is one of several scenarios whereby natural hazards are expected to threaten the capabilities of our emergency response agencies and systems, including the emergency communications system. The subduction zone is a 700-mile-long boundary between newly formed oceanic crust that is slowly advancing eastward and sliding, or subducting, under the North American continent. Scientists predict that the resulting tension between the two land masses will release every 500 years on average, with the devastating outcome being an earthquake of a magnitude 8.0 or greater and an associated tsunami.⁵ Because wide agreement among geologists about the frequency and severity of this threat has only

⁵ <http://crew.org/products-programs/cascadia-subduction-zone-earthquakes-magnitude-90-earthquake-scenario>

materialized over the last 30 years, building codes and construction standards that would protect infrastructure in Oregon from subduction zone earthquakes have only recently been implemented.

In addition to geological threats, Oregon has experienced more intense and more frequent weather events in recent years. Data gathered by the National Weather Service indicates that this trend could continue in the decades ahead. The emergency communications system is intended to perform at a high level of capability during storms and other events, even as commercial cell networks sustain power outages, equipment failures and other problems.



* Events indicated here include one or more of the following designations affecting Washington County, Oregon, made between 1990 and 2014 by the National Weather Service: Blizzard, Dense Fog, Dense Smoke, Dust Devil, Dust Storm, Excessive Heat, Extreme Cold/Wind Chill, Flash Flood, Flood, Freezing Fog, Frost/Freeze, Funnel Cloud, Hail, Heat, Heavy Rain, Heavy Snow, High Wind, Ice Storm, Lightning, Sleet, Strong Wind, Thunderstorm Wind, Tornado, Wildfire, Winter Storm, Winter Weather

Source: National Climatic Data Center, National Oceanic and Atmospheric Administration, 2015

Objectives and Assumptions

The bond measure proposed in this report would fund a transition to current technology and capabilities, leading to enhanced interoperability for emergency communication systems regionwide. The bond would also fund facility expansion and earthquake-resiliency for WCCCA's facilities. The objectives for this project are described below.

Objectives

Overall

- Purchase, install and transition to the new emergency communications system with minimum interruptions to existing operations and no degradation in current service levels.
- Achieve the project objectives such that no unnecessary enhancements are included thereby allowing for the lowest possible tax rate.

Equipment and Software

- Ensure long-term system reliability with minimum equipment repair or replacement.
- Achieve P25 standard for interoperability on a digital platform with strong signal reach across Washington County.
- Purchase and distribute enough system-compatible radio equipment for current WCCCA users to make the system effective while minimizing the cost to member agencies.
- Install and maintain equipment, towers and power supplies to maintain resiliency in the face of a Cascadia Subduction Zone earthquake, a major storm or similar hazard.

Facilities

- Meet or exceed current building code requirements in Washington County for “essential facilities”⁶ Provide for efficient expansion of the 911 center and other emergency response facilities. By using bond funding to locate emergency facilities with 911 emergency communications dispatchers, the County could more efficiently address overall space requirements.

Assumptions

To address these objectives, the equipment to be replaced with bond-financed revenue relates primarily to voice, data and paging communication systems upgrades, equipment purchases, emergency facilities, radio tower additions and improvements and building improvements. Capital expenditures would commence immediately with most project objectives to be met within five years. Revenue supporting bond payments would be derived through a property tax levy over less than a 21-year period. With this in mind, the following assumptions underpin the proposed approach.

- **Assessed value growth** -- An estimate of taxes to be generated by the property tax levy takes into account modest growth following the recent upturn in the U.S. economy. Assessed value growth rates are estimated to be in the range of 4%.
- **Delinquent taxes** -- Determinations are then made of the approximate delinquent tax collections that are due from previous tax years, which are based on historic proportional relationships between taxes collected on time and taxes that are paid on a delinquent basis. Tax collection is

⁶ Oregon Structural Specialty Code Chapter 16, Table 1604.5 Occupancy Category of Buildings and Other Structures
http://ecodes.biz/ecodes_support/free_resources/Oregon/10_Structural/10_PDFs/Chapter%2016_Structural%20Design.pdf

estimated at 95.5% in the first year of the levy, followed by a 96% collection rate in subsequent years.

- **Debt service** -- An estimate of annual payments and debt service is obtained based upon the tax revenue assumptions and interest rate charges assumed for the proposed bond, set at 2.5%.
- **Capital costs** -- Capital costs were developed from obtaining estimates from subject experts and vendors.

Recommendations

The key elements of the communication system and emergency facilities that are part of this transition include, but are not limited to:

- mobile and portable voice communication systems (radio systems);
- communication delivery systems that link together and provide communications services between all WCCA communication sites and dispatch services; and
- earthquake-resilient communication sites and emergency facilities such as towers, equipment shelters, power systems and building(s) that support dispatchers, technical support staff, administration and other emergency functions.

These estimated capital costs and taxpayer impacts are detailed below.

Borrowing Period - Bonds would be repaid over less than 21 years		
Tax Revenue	\$	127,059,100
Debt Service		127,059,100
<i>Revenue over(under) debt service</i>		
Projected average rate per \$1,000 AV over the 21 year levy	\$	0.08

Simulcast Equipment	\$	13,823,851
Member radios		12,184,000
Dispatch center upgrade		10,000,000
Additional Radio Sites		8,363,810
Master Site Equipment		4,910,567
System Refresh/Upgrade		4,134,200
Generator/Commercial		3,831,430
Microwave Backhaul		2,137,081
Console Equipment		1,907,807
Fire Station Alerting Systems		1,839,876
Site Alarms and Monitoring		1,246,096
Spares and Materials		893,200
48 VDC Power System		832,776

Contingency Equipment	455,532
Backup Dispatch	451,256
Test Equipment	393,000
Paging	284,998
Unified PTT (mobile dev)	246,550
Logging Recorder	231,568
Asset Management	182,348
subtotal	68,349,946
Contingency; % of total project	7,198,924
Total	75,548,870
<i>Rounded</i>	76,000,000
	<u>divide by 1,000</u>
Bond issuance costs =	
\$11/1,000; from Financial	76,000
Advisors	x \$ 11
Estimated cost of issuance	836,000
Project cost; rounded	76,000,000
Total including cost of issuance	76,836,000
Project cost; rounded	77,000,000
Interest on 21-year bonds	\$ 50,059,100

Taxpayer Impacts

Given the total estimated capital costs of no more than \$77 million, a property tax levy is recommended with a rate not estimated to exceed 8-cents per \$1,000 of assessed value over less than 21 years. For a resident owning a home with the countywide average assessed value of \$255,408, this tax impact equates to a first-year annual cost of approximately \$20 or \$1.70 per month.

Implementation

Over less than a 21-year period, the cycle of taxes levied and debt financing is estimated as follows.

Levy Period Est. Under 21 Years	Revenue	127,059,100				
Assumptions	difference	-				
4.00%	AV (assessed value) increase					
95.5%	Collection rate first year; no delinquent taxes					
96.0%	Collection rate subsequent years					
	Year					
	1	2	3	4	5	
	<i>2016-17 first year of GO tax levy</i>					
	2016-17	2017-18	2018-19	2019-20	2020-21	
Assessed value	59,087,019,930	61,450,500,727	63,908,520,756	66,464,861,586	69,123,456,050	
Taxes levied	4,758,542	5,003,037	5,201,047	5,410,471	5,625,131	
Tax rate	0.08	0.08	0.08	0.08	0.08	
Taxes collected	4,568,200	4,777,900	4,967,000	5,167,000	5,372,000	
<i>Debt service</i>	4,568,200	4,777,900	4,967,000	5,167,000	5,372,000	
	Year					
	6	7	8	9	10	
	2021-22	2022-23	2023-24	2024-25	2025-26	
Assessed value	71,888,394,292	74,763,930,063	77,754,487,266	80,864,666,756	84,099,253,427	
Taxes levied	5,851,309	6,082,461	6,328,010	6,581,152	6,845,812	
Tax rate	0.08	0.08	0.08	0.08	0.08	
Taxes collected	5,588,000	5,808,750	6,043,250	6,285,000	6,537,750	
<i>Debt service</i>	5,588,000	5,808,750	6,043,250	6,285,000	6,537,750	
	Year					
	11	12	13	14	15	
	2026-27	2027-28	2028-29	2029-30	2030-31	
Assessed value	87,463,223,564	90,961,752,506	94,600,222,606	98,384,231,511	102,319,600,771	
Taxes levied	7,120,419	7,403,403	7,698,429	8,008,901	8,327,487	
Tax rate	0.08	0.08	0.08	0.08	0.08	
Taxes collected	6,800,000	7,070,250	7,352,000	7,648,500	7,952,750	
<i>Debt service</i>	6,800,000	7,070,250	7,352,000	7,648,500	7,952,750	

	Year					Total	
	16	17	18	19	20 & 21		
	2031-32	2032-33	2033-34	2034-35	2035-36 & 2036-37		
Assessed value	106,412,384,802	110,668,880,194	115,095,635,402	119,699,460,818	No levy		
Taxes levied	8,662,827	9,007,330	9,364,136	9,741,361	anticipated		
Tax rate	0.08	0.08	0.08	0.08	for these		
Taxes collected	8,273,000	8,602,000	8,942,750	9,303,000	fiscal years.	127,059,100	
Debt service	8,273,000	8,602,000	8,942,750	9,303,000		127,059,100	

Timeline for Adoption

To achieve full consideration of this proposal by all stakeholders and the voters of Washington County, the following sequence of events is recommended.

April 2015	Costing options completed
May 2015	Fire Defense Board approval
May 2015	Law Enforcement Council approval
May - June 2015	City & special district manager discussion
July 2015	Voter survey completed
Oct 1, 2015	WCCCA full Board consideration
Oct. 15, 2015	Public Safety Coordinating Council (PSCC) consideration
Dec. 15, 2015	Board of County Commissioners briefing in worksession
Jan. 5, 2016	Board to approve proposal and direct County Counsel to draft ballot title
Jan. 19, 2016	Board consideration of ballot title and filing measure for election
May 17, 2016	Primary Election Day

Conclusion

A great deal has changed since our current emergency communications system was purchased and installed in the early 1990s. New communications technology is available now that would allow for continued, reliable response for police, fire and medical emergencies. Our population has also grown significantly over the last 25 years, and continued growth and demand for emergency services is projected for the future. The equipment and technology upgrades described here would enable our 911 center to transition to current technology and capabilities, install additional towers where necessary, strengthen facilities for earthquakes, storms or other emergencies, provide for efficient expansion of the 911 center and emergency-response facilities, and replace approximately 3,000 analog radios currently used by first responders throughout the county. In summary, the technology and facilities improvements outlined in this proposal would allow our mission-critical 911 dispatch center to serve our community reliably in the decades ahead.